Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

SUPPORTING INFORMATION

Heteronuclear Lanthanide-Based Coordination Polymers Exhibiting Tunable Multiple Emission Spectra.

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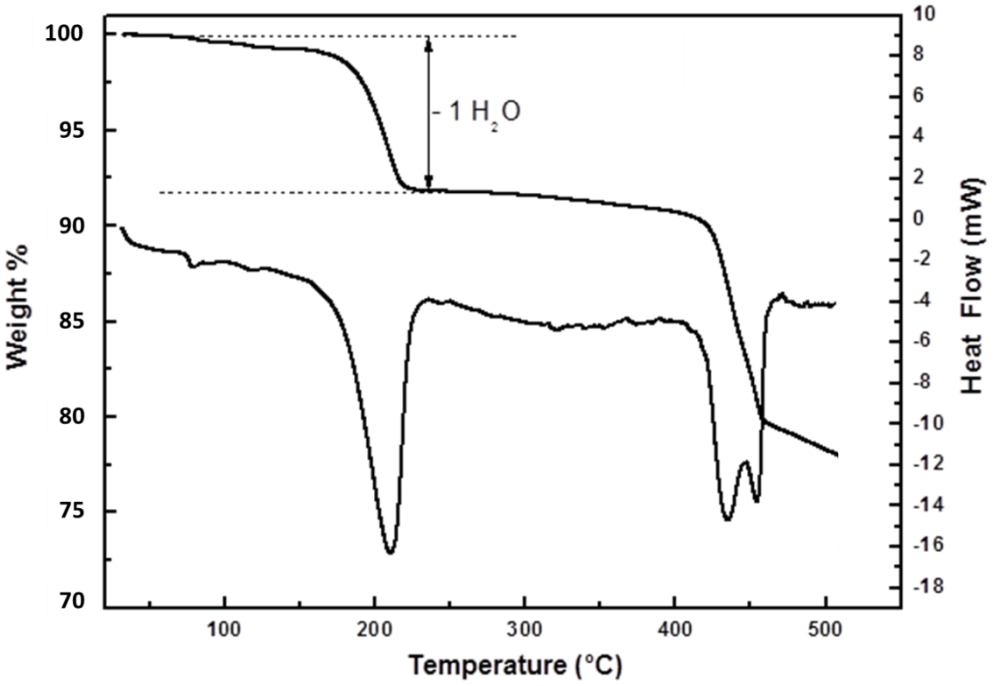

Figure S1. *Thermal analyses of $Na_2(hip),H_2O$.*

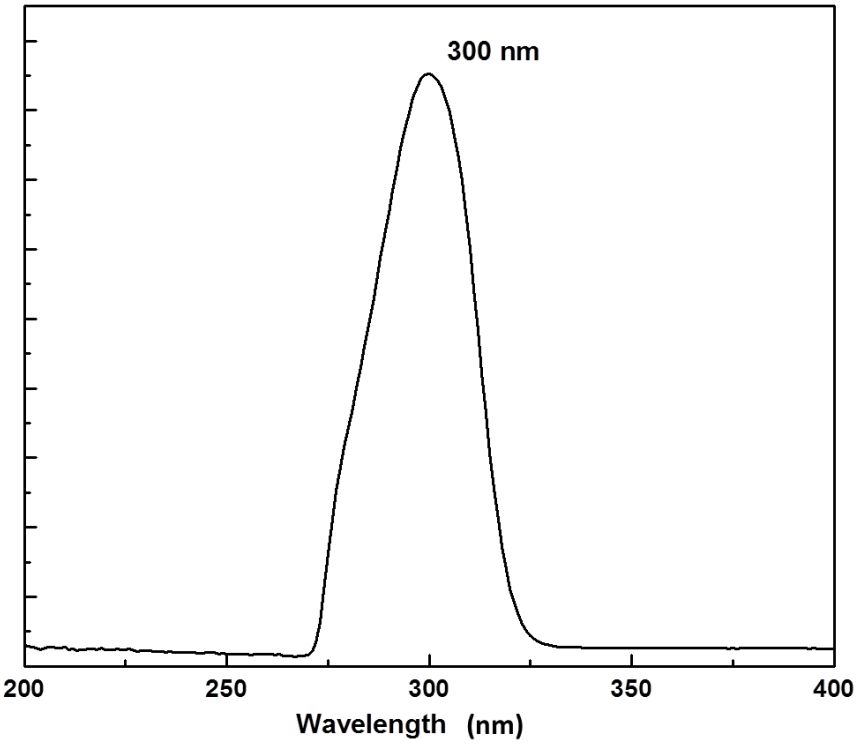

Figure S2. *UV-vis absorption spectrum of an aqueous solution (10mg.L^{-1}) of $Na_2(hip),H_2O$*

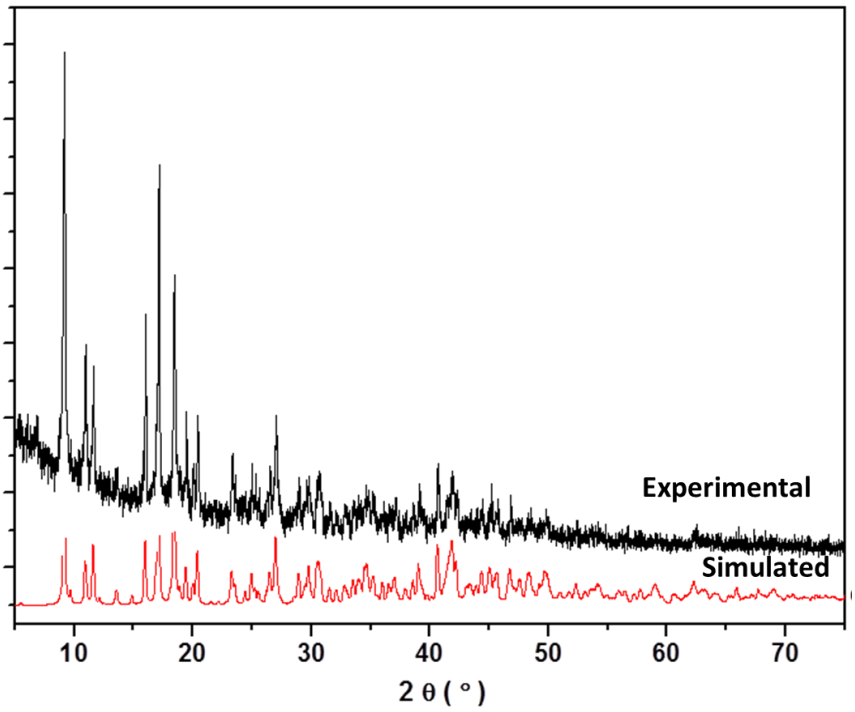

Figure S3. *Simulated and experimental powder X-ray diffraction diagrams of Ce-based microcrystalline powder with chemical formula* $[Ce_2(hip)_3(H_2O)_9,6H_2O]_\infty$. *The simulated X-ray diffraction pattern has been calculated on the basis of a reported crystal structure (n°CCDC : 989811)*[59]

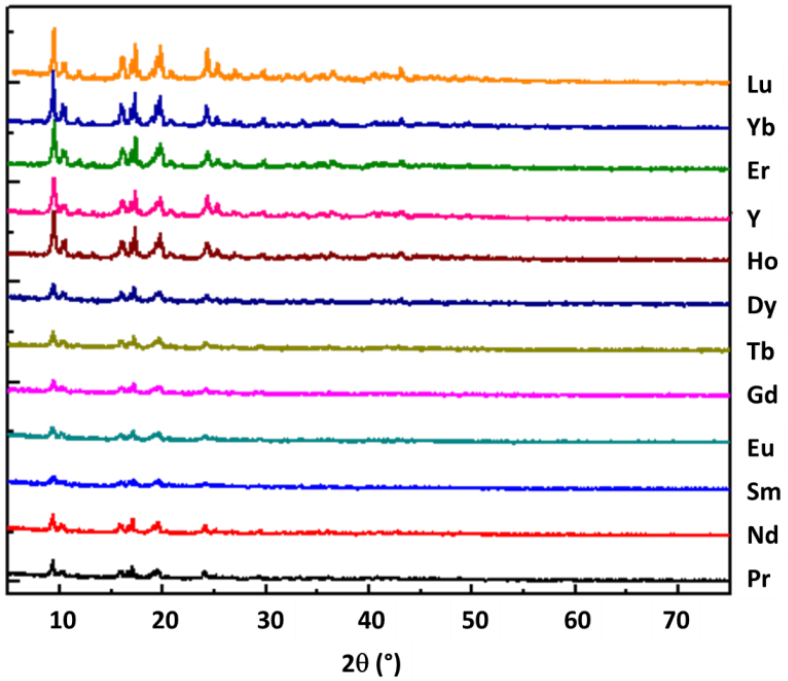

Figure S4. *Powder X-ray diffraction diagrams of the homo-nuclear compounds* $[Ln(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ *with Ln = Pr – Lu.*

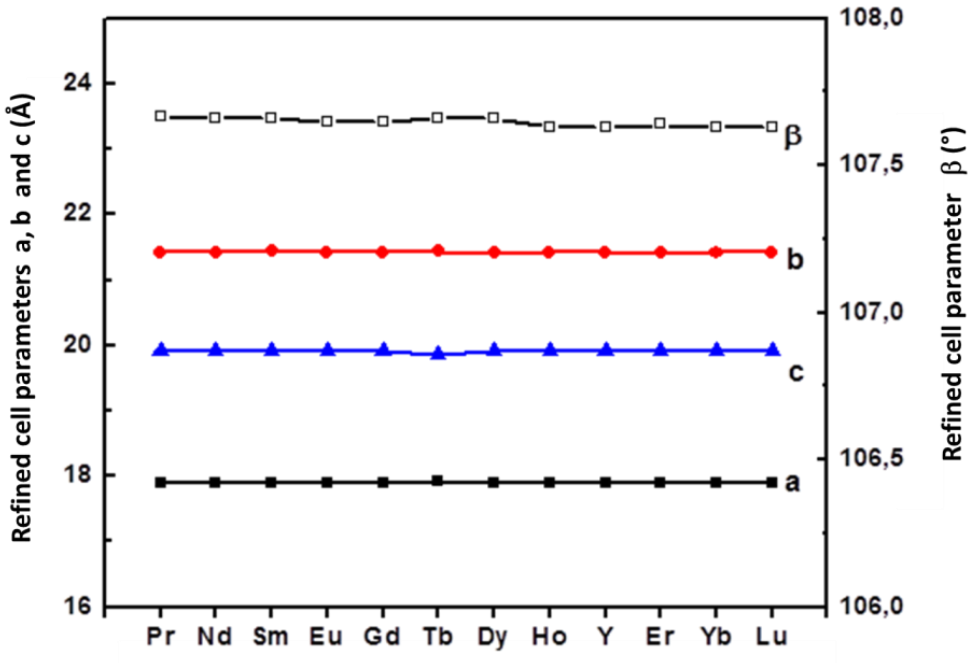

Figure S5. *Refined cell parameters for* $[Ln_2(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ *with Ln = Pr-Lu or Y versus the involved lanthanide ion. Numerical results are listed in table S1.*

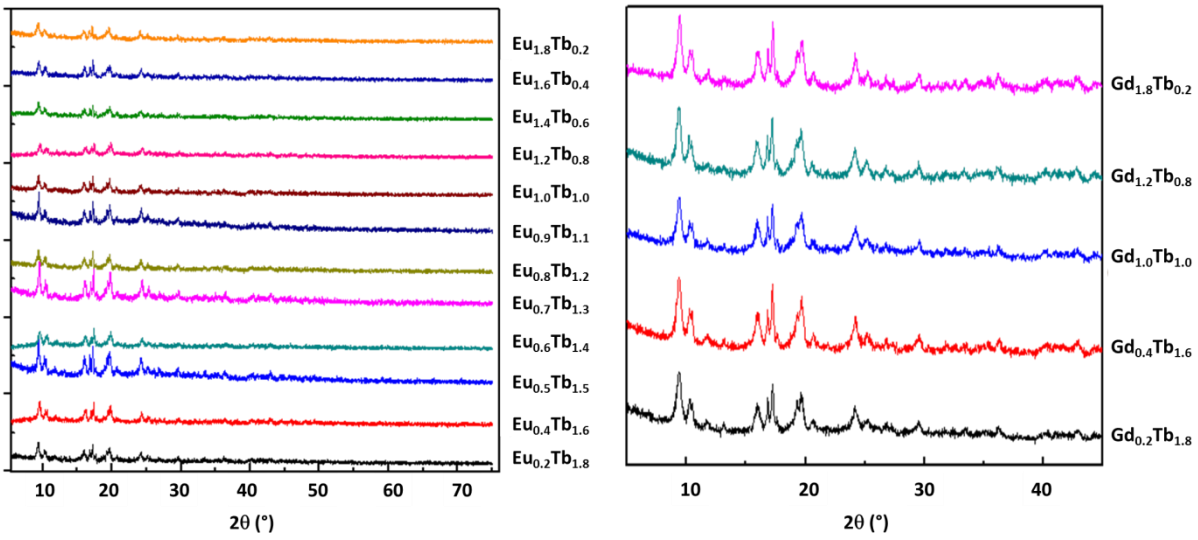

Figure S6. *Powder X-ray diffraction patterns for some* $[Eu_{2-2x}Tb_{2x}(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ *(left) and* $[Gd_{2-2x}Tb_{2x}(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ *(right) compounds with* $0.1 \leq x \leq 0.9$.

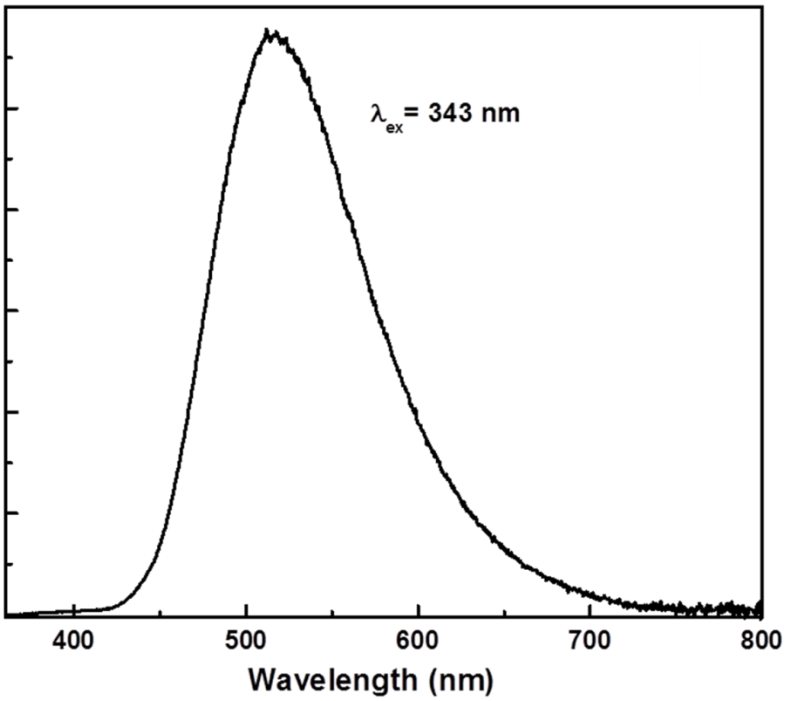

Figure S7. *Emission spectrum of* $[Gd(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ *recorded at 77K under UV irradiation (*λ_{exc} *= 343 nm)*

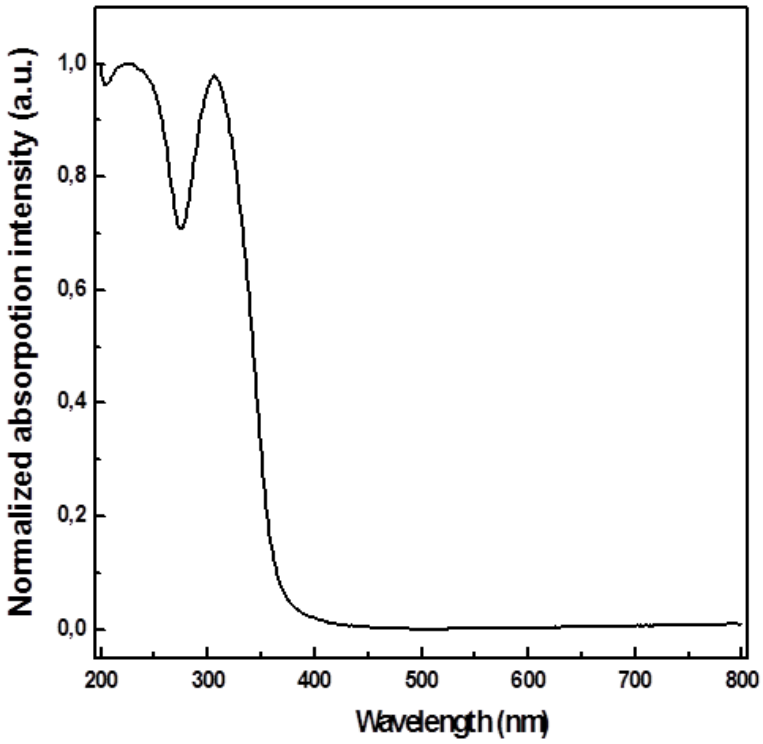

Figure S8. *Solid state absorption spectrum of* $[Gd(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$.

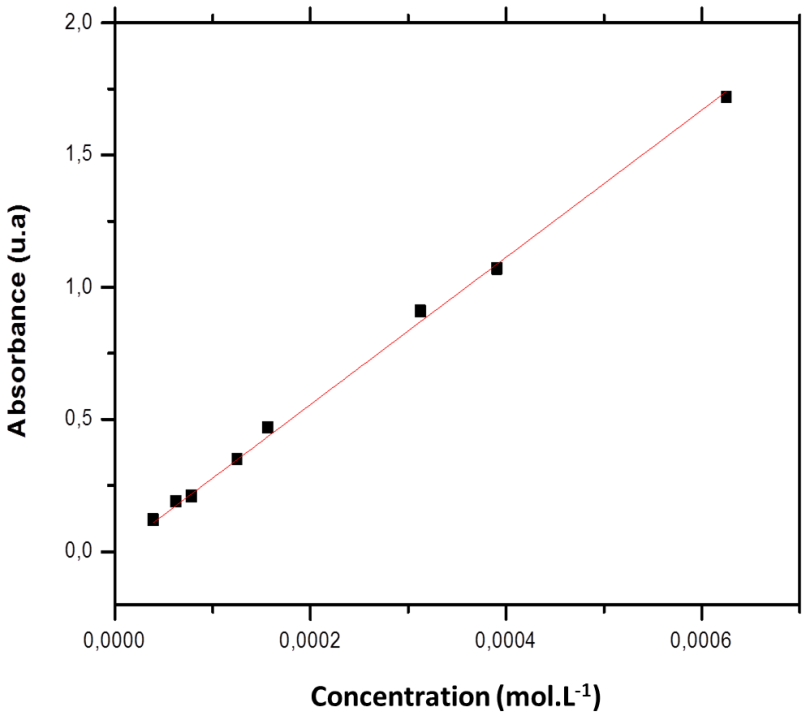

Figure S9. *Absorbance versus concentration of dilute aqueous solutions of $Na_2(hip),H_2O$*

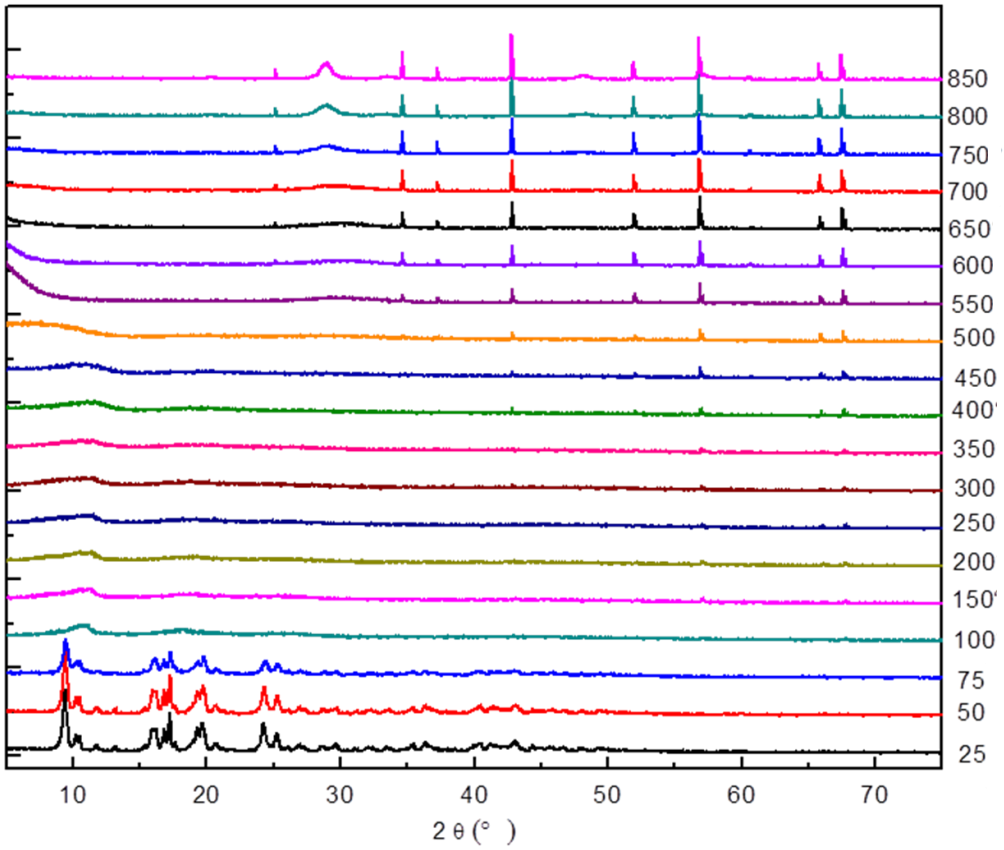

Figure S10. TDXD diagrams under N_2 flux between room temperature and 850°C for $[Gd_2(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$.

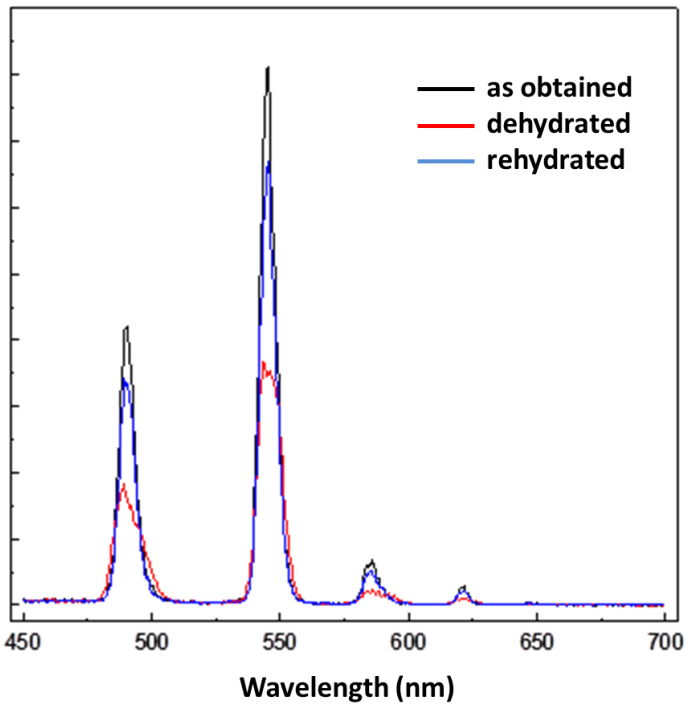

Figure S11. *Emission spectra of* $[Tb_2(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ *microcrystalline powders* (λ_{exc} *= 343 nm).*

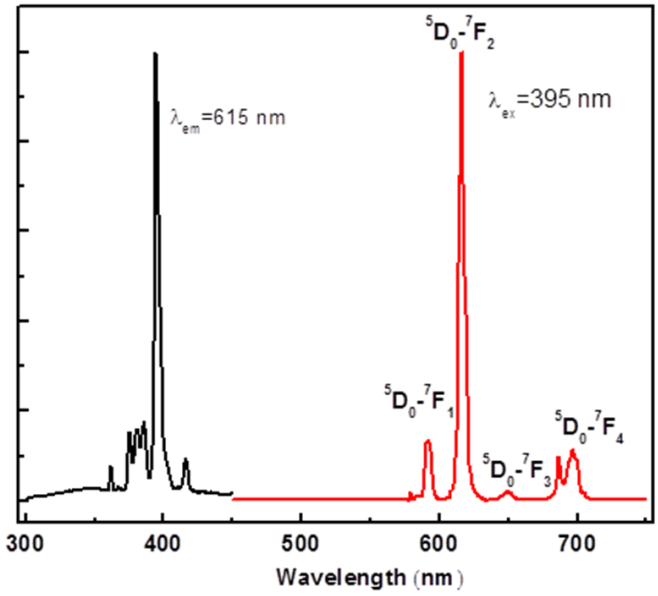

Figure S12. *Excitation and emission spectra of* $[Eu_1Tb_1(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$.

Table S1. Refined cell parameters for $[Ln(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ with Ln = Pr-Lu or Y

	a (Å)	b (Å)	c (Å)	β (°)
Pr	17.90(1)	21.42(1)	19.92(1)	107.67(1)
Nd	17.91(1)	21.43(1)	19.91(1)	107.66(1)
Sm	17.89(1)	21.43(1)	19.91(1)	107.66(1)
Eu	17.90(1)	21.42(1)	19.92(1)	107.65(1)
Gd	17.91(1)	21.42(1)	19.91(1)	107.65(1)
Tb	17.91(1)	21.44(1)	19.87(1)	107.66(1)
Dy	17.91(1)	21.41(1)	19.92(1)	107.66(1)
Ho	17.90(1)	21.42(1)	19.91(1)	107.63(1)
Y	17.90(1)	21.42(1)	19.92(1)	107.63(1)
Er	17.90(1)	21.41(1)	19.92(1)	107.64(1)
Yb	17.89(1)	21.42(1)	19.91(1)	107.63(1)
Lu	17.90(1)	21.41(1)	19.92(1)	107.63(1)

Table S2. Selected hydrogen bond distances in stair-like double-chains molecular motifs.

Atom 1	symmetry	Atom 2	symmetry	distance (Å)
O2	x, y, z	O31	x, y, z	2.6546(5)
O9	x, y, z	O30	x, y, z	2.6312(6)
O19	x, y, z	O27	-1+x, y, z	2.7248(6)
O15	x, y, z	O28	x, y, z	2.6517(5)
O16	x, y, z	O21	-1+x, y, z	2.7306(5)
O14	x, y, z	O34	-1+x, y, z	2.7561(6)
O11	x, y, z	O35	x, y, z	2.7015(5)

Table S3. π-stacking interactions. Selected C-C distances.

Atom 1	symmetry	Atom 2	symmetry	distance (Å)
C102	x, y, z	C104	x, y, z	3.7834(10)
C58	x, y, z	C77	x, y, z	3.7564(9)
C50	x, y, z	C70	x, y, z	3.7468(9)
C69	x, y, z	C89	x, y, z	3.8233(10)
C48	x, y, z	C72	x, y, z	3.8141(10)
C63	x, y, z	C202	x, y, z	3.7496(9)

Table S4. Selected hydrogen bond distances between stair-like double-chains molecular motifs.

Atom 1	Symmetry	Atom 2	symmetry	distance (Å)
O17	x, y, z	O57	-x, 1-y, 1-z	3.2494(5)
O45	x, y, z	O51	1.5+x, 0.5-y, 0.5+z	2.7208(6)
O36	x, y, z	O57	0.5-x, -0.5+y, 0.5-z	2.8414(5)
O31	x, y, z	O47	x, y, z	2.9350(6)
O49	x, y, z	O53	1-x, 1-y, 1-z	3.4662(7)
O4	x, y, z	O49	x, y, z	2.8242(6)
O25	x, y, z	O49	0.5+x, 0.5-y, -0.5+z	2.7631(5)
O15	x, y, z	O42	x, y, z	2.7671(6)
O4	x, y, z	O43	0.5+x, 0.5-y, 0.5+z	2.8200(5)

Table S5. π-stacking interactions between stair-like double-chains molecular motifs.. Selected C-C distances.

Atom 1	symmetry	Atom 2	symmetry	distance (Å)
C79	x, y, z	C88	x, y, z	3.6755(7)
C67	x, y, z	C83	x, y, z	3.4982(7)
C53	x, y, z	C99	x, y, z	3.8969(7)
C61	x, y, z	C65	x, y, z	3.9559(8)
C56	x, y, z	C93	x, y, z	3.5828(7)
C59	x, y, z	C64	x, y, z	3.8255(8)

Table S6. Colorimetric coordinates for $[Gd_{2-2x}Tb_{2x}(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ with $x \geq 0.1$ under UV irradiation (λ_{exc} = 345 nm).

compound	Colorimetric coordinates	
x	x	y
1	0.34(1)	0.60(1)
0.9	0.34(1)	0.60(1)
0.8	0.34(1)	0.60(1)
0.7	0.34(1)	0.60(1)
0.6	0.34(1)	0.60(1)
0.5	0.34(1)	0.60(1)
0.4	0.33(1)	0.60(1)
0.3	0.33(1)	0.60(1)
0.2	0.33(1)	0.60(1)
0.1	0.33(1)	0.61(1)

Table S7. Colorimetric coordinates for $[Eu_{2-2x}Tb_{2x}(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ with $0 \leq x \leq 1$ under UV irradiation (λ_{exc} = 345 nm).

Compound	Colorimetric coordinates	
x	x	y
1	0.34(1)	0.59(1)
0.9	0.34(1)	0.58(1)
0.8	0.34(1)	0.57(1)
0.75	0.36(1)	0.52(1)
0.7	0.35(1)	0.57(1)
0.65	0.36(1)	0.46(1)
0.6	0.35(1)	0.54(1)
0.55	0.36(1)	0.36(1)
0.5	0.35(1)	0.48(1)
0.4	0.35(1)	0.39(1)
0.3	0.35(1)	0.29(1)
0.2	0.35(1)	0.24(1)
0.1	0.34(1)	0.23(1)
0	0.34(1)	0.21(1)

Table S8. Colorimetric coordinates for $[Eu_{2-2x}Tb_{2x}(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ with $0 \leq x \leq 1$ under UV irradiation (λ_{exc} = 375 nm).

	Colorimetric coordinates	
x	x	y
1	0.26(1)	0.57(1)
0.9	0.27(1)	0.57(1)
0.8	0.29(1)	0.56(1)
0.75	0.31(1)	0.55(1)
0.7	0.32(1)	0.53(1)
0.65	0.36(1)	0.51(1)
0.6	0.38(1)	0.50(1)
0.55	0.44(1)	0.46(1)
0.5	0.47(1)	0.44(1)
0.4	0.57(1)	0.38(1)
0.3	0.62(1)	0.35(1)
0.2	0.66(1)	0.33(1)
0.1	0.67(1)	0.33(1)
0	0.68(1)	0.32(1)

Table S9. Colorimetric coordinates for $[Eu_{2-2x}Tb_{2x}(hip)_2(H_2O)_{10},(hip),4H_2O]_\infty$ with $0 \leq x \leq 1$ under UV irradiation (λ_{exc} = 395 nm).

	Colorimetric coordinates	
x	x	y
0.9	0.65(1)	0.32(1)
0.8	0.60(1)	0.37(1)
0.75	0.64(1)	0.35(1)
0.7	0.65(1)	0.34(1)
0.65	0.65(1)	0.34(1)
0.6	0.66(1)	0.33(1)
0.55	0.67(1)	0.33(1)
0.5	0.67(1)	0.32(1)
0.4	0.67(1)	0.33(1)
0.3	0.67(1)	0.33(1)
0.2	0.67(1)	0.33(1)
0.1	0.67(1)	0.33(1)
0	0.67(1)	0.33(1)